

# **PRELIMINARY/FINAL DRAINAGE REPORT FOR RAPSON SUBDIVISION**

JULY 2021

Prepared for:

ANDREA and WILLIAM RAPSON  
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Colorado Springs, CO 80908

Prepared By:

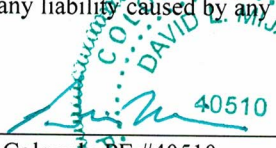


PCD FILE NO's: MS-21-003

PRELIMINARY/FINAL DRAINAGE REPORT  
RAPSON SUBDIVISION

**Engineer's Statement:**

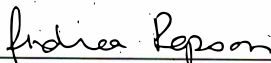
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

  
\_\_\_\_\_  
David L. Mijares, Colorado PE #40510  
For and on behalf of Catamount Engineering

7.5.21  
\_\_\_\_\_  
Date

**Owner/Developer's Statement:**

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

  
\_\_\_\_\_  
Owner Name

7/5/21  
\_\_\_\_\_  
Date

By: Andrea Rapson  
\_\_\_\_\_

Title: owner  
\_\_\_\_\_

Address: 10870 Elizabeth Way  
Colorado Springs, CO 80908

**El Paso County:**

Filed in accordance with the requirements of the El Paso County land Development Code and the Drainage Criteria manual Volumes 1 and 2, and the El Paso County Engineering Criteria Manual, latest revision.

\_\_\_\_\_  
Jennifer Irvine, PE  
County Engineer/ECM Administrator

\_\_\_\_\_  
Date

Conditions:

# **PRELIMINARY/FINAL DRAINAGE REPORT for RAPSON SUBDIVISION**

## **PURPOSE**

The purpose of this drainage report is to identify existing drainage patterns & quantify storm water runoff for the purpose of subdividing the parcel into two lots and to determine the proposed drainage easement limit requirements. There are no improvements proposed at this time, however a conceptual house and driveway location has been included for lot 2 for potential runoff increase determination.

## **GENERAL LOCATION AND DESCRIPTION**

The subject 19.344 acres consists of unplatted land to be developed into 2 rural residential lots (RR-5 zoning) located within the SE ¼ of Section 14, Township 11 South, Range 65 West of the 6<sup>th</sup> principal meridian in unincorporated El Paso County. The parcel is bounded to the north by Hardy Road right-of-way, to the east by Country Squire Estates Filing No. 1 lots 17 and 18, and to the south and west by unplatted land. There is an existing house and driveway located on lot 1, which shall remain. Lot 2 is undeveloped at this time.

The parcel is located within the West Kiowa Creek drainage basin. An unnamed tributary to West Kiowa Creek (hereinafter referred to as the “creek”) bisects the parcel and flows from southwest to northeast. The northerly portion of the parcel sheet flows south to the creek within the RR-5 zoned parcel at slopes between 4% and 18%. The southerly portion of the parcel sheet flows north to the creek within the parcel at slopes between 3% and 8%.

Existing soils on the site consist of Alamosa loam, hydrologic soil group D, and Elbeth sandy loam, hydrologic soil group B as determined by the Natural Resources Conservation Service Web Soil Survey. The site is vegetated with native grasses. Shrub and tree cover are evident.

No portion of the site lies within an F.E.M.A. designated floodplain per FIRM 08041C0310 G effective December 7, 2018. A FEMA Firmette exhibiting the parcel has been included in the appendix of this report.

## **DRAINAGE CONDITIONS**

No existing studies on the site have been identified. The parcel exists along a 990lf reach of an unnamed tributary to West Kiowa Creek which bisects the parcel. The majority of the area was modeled as agricultural and forest land. However, Hardy Road (gravel) as well as the existing gravel driveway and house was accounted for as well. There are no proposed improvements at this time, however a conceptual house and driveway location has been assumed for peak runoff increase determination for lot 2.

The geologic hazard limits as determined by the geotechnical engineer (refer to geologic hazard report) were used in conjunction with the 100yr water surface elevation location to set the proposed drainage and geologic hazard easement location which is shown on the drainage plan.

A HEC-RAS model of the creek through the site has been prepared utilizing flows computed with the use of HydroCad (TR-20) and USGS (Regression Equations) StreamStats hydrologic models. The models yielded peak flow values of 88cfs and 70cfs for the 100yr storm respectively. Velocities in the channel are lower than 5.0ft/s (actual velocities are in the range of 2.1ft/s to 3.5ft/s) and are therefore considered non-erosive (i.e. – 5.0ft/s or lower for sandy material). Froude numbers are generally lower than 1.0 (with the exception of one section with a value of 1.02) which further substantiates the erosiveness of the channel is minimal. It is noteworthy to mention that the flows computed by both models are lower than you would expect if you used the rational method. However, since the watershed is ~416acres, the SCS method and the regression equation method is more applicable. Therefore the higher of the two values (88cfs) was used. The vegetation of the channel can be described as grass lined, with no erosion present. The channel slope thru the parcel ranges from 1.2% to 1.9%.

Basin A (7.45 Acres) represents portions of the proposed residential lots 1 and 2. Runoff generated within the basin will sheet flow northerly to the creek.

Basin B (4.36 Acres) represents portions of the proposed residential lots 1 and 2. Runoff generated within the basin will sheet flow south and easterly to the Creek.

Basin C (EXISTING) (5.27 Acres) represents portions of the proposed residential lots 1 and 2 the southerly half of the existing Hardy Road gravel roadway. Runoff generated within the basin will sheet flow southerly to the creek.

Basin C (DEVELOPED) (5.27 Acres) represents portions of the proposed residential lots 1 and 2 the southerly half of the existing Hardy Road gravel roadway. A conceptual house and driveway layout on lot 2 has been assumed and accounted for in the calculations. Runoff generated within the basin will sheet flow southerly to the creek.

Basin D (2.85 Acres) represents portions of the proposed residential lots 1 and 2. Runoff generated within the basin will sheet flow northerly to the creek.

The rational methodology was utilized in analyzing on-site basins for development of on-site improvements. The minor increase in impervious area due to the addition of one small homesite development on each of the two lots within the 20-acre subdivision would not substantially impact historic drainage patterns. Detention is not typically pursued in rural development scenarios unless undetained upstream development would negatively affect the development. A significant portion of runoff generated within typical rural development does not flow directly into County stormwater systems but leaves improved areas as sheet flow into undeveloped and vegetated portions of lots and infiltrates into the ground.

See Appendix for Calculations.

## **WATER QUALITY/4-STEP PROCESS**

The project addresses Low Impact Development strategies primarily through the utilization of small impervious areas.

### **Step 1-Employ Runoff Reduction Practices**

Impervious areas (e.g. - Hardy Road (gravel)) generated adjacent the development and within the development (existing and proposed house and driveway) will flow across pervious areas prior to discharging into the creek located within the site. Calculations for runoff reduction for the proposed house and driveway on lot 2 is included in the appendix.

### **Step2-Stabilize Drainageway**

The unnamed tributary to the creek which runs through the site and reduced runoff due to substantial conveyance across pervious areas at relatively flat grades will mitigate the existing impervious area (e.g. - Hardy Road (gravel)) and proposed impervious area (e.g. – driveway and house) prior to affecting the receiving drainageways.

### **Step3-Provide Water Quality Capture Volume**

Permanent water quality facility is not proposed for development of large lot (2.5acre or larger lots) construction per the requirements of El Paso County Engineering Criteria Manual Section I.7.1B. A runoff reduction calculation for the proposed house and driveway located on lot 2 was analyzed utilizing UD-BMP Version 3.07. The impervious areas were identified as disconnected impervious areas draining overland to receiving pervious areas. The analysis indicates 100% water quality capture volume reduction and is included in the appendix of this report. The existing and proposed imperviousness of lot 1 is ~2.9%. The existing imperviousness of lot 2 is ~2.6%. The proposed imperviousness of lot 2 is ~4.9%. Therefore there will be an increase of 2.3% imperviousness on lot 2 only. Lot 1 imperviousness values will not change.

### **Step4-Consider Need for Industrial and Commercial BMP's**

A Grading, Erosion Control, and Stormwater Quality Plan and narrative will not be submitted for this project as there is no proposed land disturbance. No residential, industrial, or commercial density development is proposed. The requirement for construction BMP's related to the individual residence construction will be the responsibility of the contractor. No mass earthwork activities or batch plant operations are proposed with individual residence construction disturbing less than 1 acre with a proposed increase of 0.14 acres of impervious area.

## **COST ESTIMATE**

No drainage improvements are proposed with development of the low-density (rural) housing lots.

## **DRAINAGE FEE CALCULATION**

The development proposes to plat 19.344 acres within El Paso County, all contained within the West Kiowa Creek Drainage Basin. The West Kiowa Creek Drainage Basin has not been studied and no drainage or bridge fees have been adopted.

## **DRAINAGE METHODOLOGY**

This drainage report was prepared in accordance with the criteria established in the El Paso County Drainage Criteria Manual Volumes 1 and 2.

The rational method for drainage basin study areas of less than 100 acres was utilized in the on-site analysis. For the Rational Method, flows were calculated for the 5 and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 5-1 of the Drainage Criteria Manual. Time of concentration for overland flow and channel flow are calculated per Section 5.2.3 of the Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

## **SUMMARY**

The RAPSON SUBDIVISION development consists of large lot development with a slight increase (0.14ac) in impervious area. Therefore, there will be a slight increase (~0.2cfs for the 5yr and 100yr storm events) in peak runoff which is considered negligible. The subdivided parcels will not adversely affect downstream properties or facilities.

## **REFERENCES:**

County of El Paso Drainage Criteria Manual Volume 1 (revised 1994) and Volume 2 (adopted by the County in 2002)

City of Colorado Springs Drainage Criteria Manual Volume 1 (2014), Chapter 6, (adopted by the County in 2015)

Engineering Criteria Manual, El Paso County, December 2020

Federal Emergency Management Agency (FEMA): National Flood Hazard Layer FIRMette - Flood Insurance Rate map 08041C00310 G, December 7, 2018

Natural Resources Conservation Service (NRCS) Web Soil Survey

## APPENDIX



BLACK SQUIRREL RD

HARDY ROAD

SITE

HARDY ROAD



PO BOX 692 DIVIDE, CO 80814 (719) 426-2124

RAPSON SUBDIVISION

VICINITY MAP

SCALE:  
NOT TO SCALE

JOB NO.:  
**20-289**

DATE:  
2/9/21

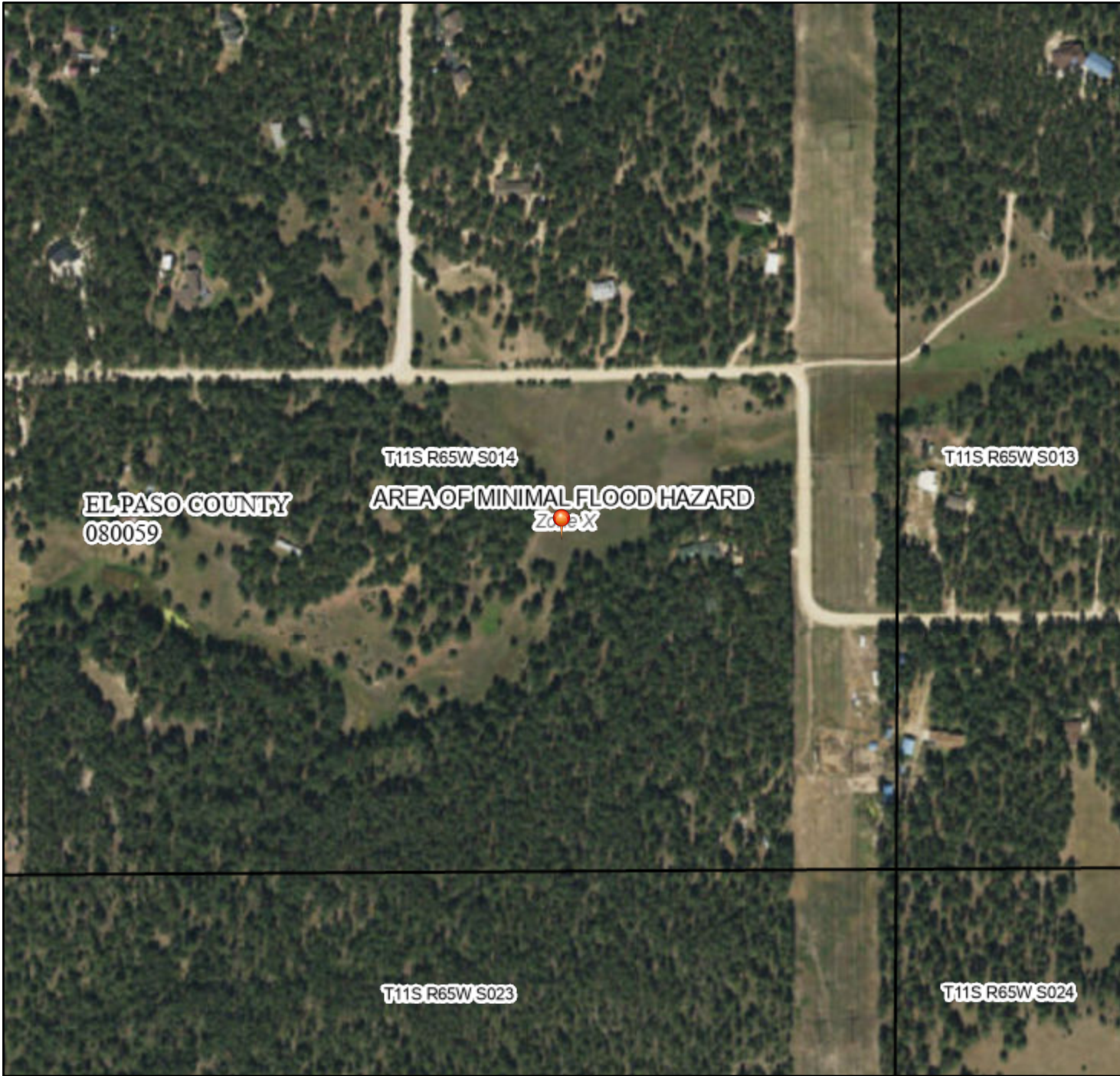
SHEET: 1 OF 1



# National Flood Hazard Layer FIRMette



104°38'3"W 39°5'31"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000  
Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **2/7/2021 at 3:04 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.





United States  
Department of  
Agriculture

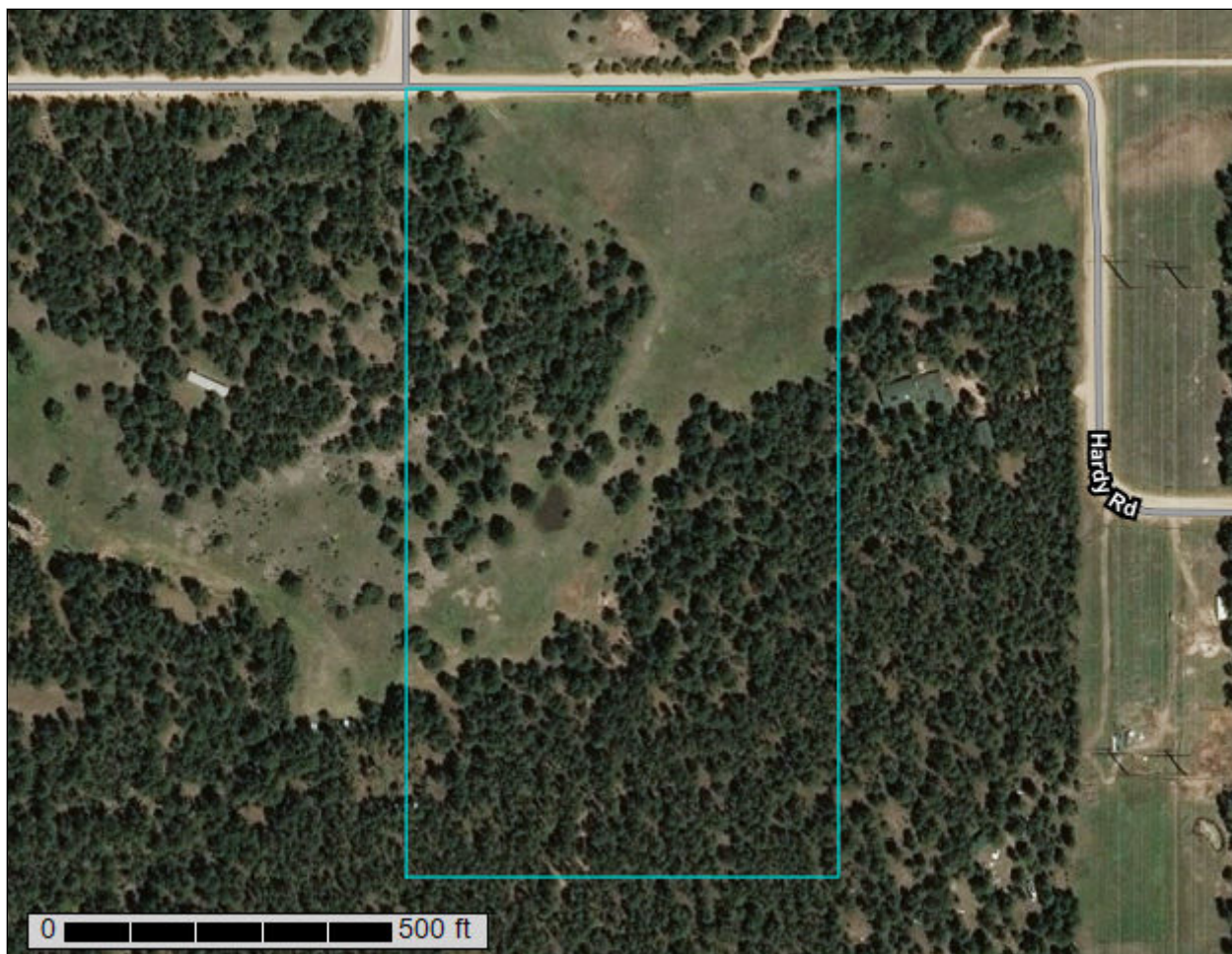
NRCS

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for El Paso County Area, Colorado

## RAPSON SUBDIVISION



February 7, 2021

# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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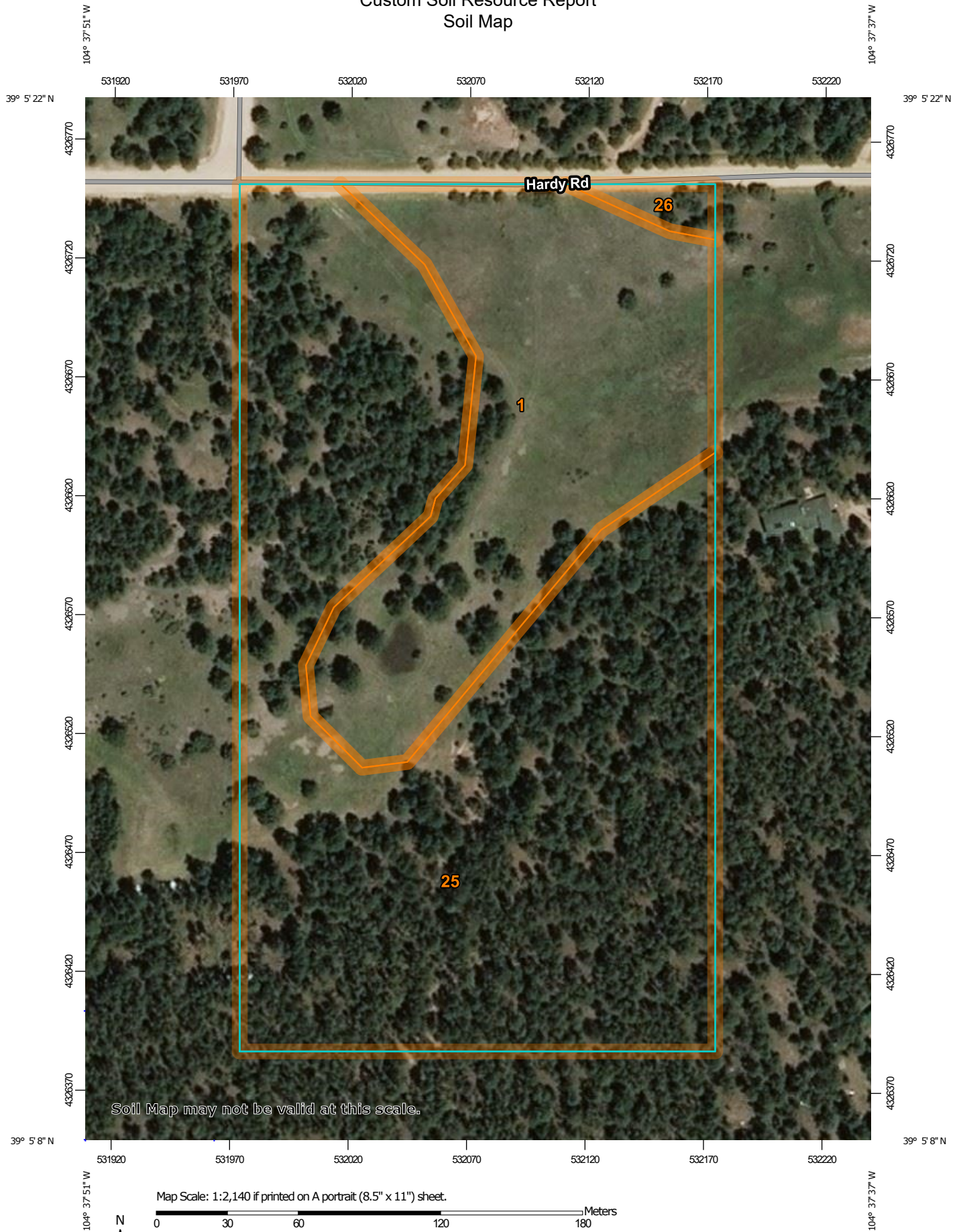
# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



# Custom Soil Resource Report Soil Map



Map Scale: 1:2,140 if printed on A portrait (8.5" x 11") sheet.


0 30 60 120 180 Meters  
0 100 200 400 600 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

# Custom Soil Resource Report


## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)


### Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines


 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals


### Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alamosa loam, 1 to 3 percent slopes	5.5	30.3%
25	Elbeth sandy loam, 3 to 8 percent slopes	12.4	68.5%
26	Elbeth sandy loam, 8 to 15 percent slopes	0.2	1.2%
<b>Totals for Area of Interest</b>		<b>18.2</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## El Paso County Area, Colorado

### 1—Alamosa loam, 1 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 3670

*Elevation:* 7,200 to 7,700 feet

*Farmland classification:* Prime farmland if irrigated and reclaimed of excess salts and sodium

#### Map Unit Composition

*Alamosa and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Alamosa

##### Setting

*Landform:* Flood plains, fans

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium

##### Typical profile

*A - 0 to 6 inches:* loam

*Bt - 6 to 14 inches:* clay loam

*Btk - 14 to 33 inches:* clay loam

*Cg1 - 33 to 53 inches:* sandy clay loam

*Cg2 - 53 to 60 inches:* sandy loam

##### Properties and qualities

*Slope:* 1 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Poorly drained

*Runoff class:* Very high

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* About 12 to 18 inches

*Frequency of flooding:* NoneFrequent

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)

*Available water capacity:* High (about 10.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 5w

*Hydrologic Soil Group:* D

*Ecological site:* R048AY241CO

*Hydric soil rating:* Yes

#### Minor Components

##### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

## 25—Elbeth sandy loam, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 367x

*Elevation:* 7,300 to 7,600 feet

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Elbeth and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Elbeth

#### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from arkose

#### Typical profile

*A - 0 to 3 inches:* sandy loam

*E - 3 to 23 inches:* loamy sand

*Bt - 23 to 68 inches:* sandy clay loam

*C - 68 to 74 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Minor Components

#### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

## 26—Elbeth sandy loam, 8 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* 367y

*Elevation:* 7,300 to 7,600 feet

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Elbeth and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Elbeth

#### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from arkose

#### Typical profile

*A - 0 to 3 inches:* sandy loam

*E - 3 to 23 inches:* loamy sand

*Bt - 23 to 68 inches:* sandy clay loam

*C - 68 to 74 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water capacity:* Moderate (about 7.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Minor Components

#### Pleasant

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

## Custom Soil Resource Report

### **Other soils**

*Percent of map unit:*

*Hydric soil rating:* No

# BASIN HYDROLOGY

BASIN RATIONAL CALCULATIONS - EXISTING CONDITIONS

BASIN	AREA TOTAL (Acres)						CONVEYANCE TC						TT				
		C <sub>5</sub>	C <sub>100</sub>	Length	Height	TI	Length	Height	C <sub>v</sub>	Slope	Velocity	TC	TOTAL	I <sub>5</sub>	I <sub>100</sub>	Q <sub>5</sub>	Q <sub>100</sub>
				(ft)	(ft)	(min)	(ft)	(ft)		(%)	(fps)	(min)	(min)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)
<b>A</b>	7.45	<b>0.15</b>	<b>0.50</b>	465	30	11.2	425	8	20	1.9%	2.7	2.6	13.8	3.6	6.1	4.1	22.8
FOREST	7.02	0.15	0.50														
AGRICULTURE	0.43	0.16	0.51														
<b>B</b>	4.36	<b>0.17</b>	<b>0.51</b>	371	28	19.1	470	8	20	1.7%	2.6	3.0	22.1	2.9	4.9	2.2	11.0
ROOF	0.09	0.75	0.83														
DRIVE/WALK	0.02	0.90	0.96														
FOREST	2.60	0.15	0.50														
AGRICULTURE	1.65	0.16	0.51														
<b>C</b>	5.27	<b>0.19</b>	<b>0.52</b>	310	19	14.4	110	2	20	1.8%	2.7	0.7	15.1	3.5	5.9	3.6	16.3
GRAVEL	0.41	0.63	0.74														
FOREST	2.19	0.15	0.50														
AGRICULTURE	2.67	0.16	0.51														
<b>D</b>	2.85	<b>0.15</b>	<b>0.50</b>	275	18	9.4	330	7	20	2.1%	2.9	1.9	11.3	3.9	6.6	1.7	9.5
FOREST	2.42	0.15	0.50														
AGRICULTURE	0.43	0.16	0.51														

LOT 1 - Imperviousness

Land Use	%Imp	Acreage	Composite % Imp.
Roof	90	0.09	2.9
Forest	0	9.62	
Drive/Walk	100	0.02	
Agriculture	2	4.66	
Gravel	80	0.28	
Total		14.67	

LOT 2 - Imperviousness

Land Use	%Imp	Acreage	Composite % Imp.
Roof	90	0.00	2.6
Forest	0	1.48	
Drive/Walk	100	0.00	
Agriculture	2	3.67	
Gravel	80	0.08	
Total		5.23	

Calculated by: DLM

Date: 7/2/2021



BASIN RATIONAL CALCULATIONS -DEVELOPED CONDITIONS

							CONVEYANCE TC						TT				
BASIN	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	Length (ft)	Height (ft)	TI (min)	Length (ft)	Height (ft)	C <sub>v</sub>	Slope (%)	Velocity (fps)	TC (min)	TOTAL (min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
<b>A</b>	7.45	<b>0.15</b>	<b>0.50</b>	465	30	11.2	425	8	20	1.9%	2.7	2.6	13.8	3.6	6.1	4.1	22.8
FOREST	7.02	0.15	0.50														
AGRICULTURE	0.43	0.16	0.51														
<b>B</b>	4.36	<b>0.17</b>	<b>0.51</b>	371	28	19.1	470	8	20	1.7%	2.6	3.0	22.1	2.9	4.9	2.2	11.0
ROOF	0.09	0.75	0.83														
DRIVE/WALK	0.02	0.90	0.96														
FOREST	2.60	0.15	0.50														
AGRICULTURE	1.65	0.16	0.51														
<b>C</b>	5.27	<b>0.21</b>	<b>0.53</b>	310	19	14.4	110	2	20	1.8%	2.7	0.7	15.1	3.5	5.9	3.8	16.5
ROOF	0.07	0.75	0.83														
DRIVE/WALK	0.02	0.90	0.96														
GRAVEL	0.46	0.63	0.74														
FOREST	2.19	0.15	0.50														
AGRICULTURE	2.53	0.16	0.51														
<b>D</b>	2.85	<b>0.15</b>	<b>0.50</b>	275	18	9.4	330	7	20	2.1%	2.9	1.9	11.3	3.9	6.6	1.7	9.5
FOREST	2.42	0.15	0.50														
AGRICULTURE	0.43	0.16	0.51														

LOT 1 - Imperviousness

Land Use	%Imp	Acreage	Composite % Imp.
Roof	90	0.09	2.9
Forest	0	9.62	
Drive/Walk	100	0.02	
Agriculture	2	4.66	
Gravel	80	0.28	
Total		14.67	

LOT 2 - Imperviousness

Land Use	%Imp	Acreage	Composite % Imp.
Roof	90	0.07	4.9
Forest	0	1.48	
Drive/Walk	100	0.02	
Agriculture	2	3.53	
Gravel	80	0.13	
Total		5.23	

Calculated by: DLM

Date: 7/2/2021

SURFACE ROUTING CALCULATIONS - EXISTING CONDITIONS

				TT				
DESIGN POINT	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	TOTAL (min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
DP-1	19.93	0.17	0.51	29.5	2.5	4.2	8.3	42.7
A	7.45	0.15	0.50					
B	4.36	0.17	0.51					
C	5.27	0.19	0.52					
D	2.85	0.15	0.50					

Calculated by: DLM

Date: 7/2/21

SURFACE ROUTING CALCULATIONS - DEVELOPED CONDITIONS

				TT				
DESIGN POINT	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	TOTAL (min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
DP-1	19.93	0.17	0.51	29.5	2.5	4.2	8.5	42.9
A	7.45	0.15	0.50					
B	4.36	0.17	0.51					
C	5.27	0.21	0.53					
D	2.85	0.15	0.50					

Calculated by: DLM

Date: 7/2/21

# Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 1

Designer: DAVID MIJARES  
 Company: CATAMOUNT ENGINEERING  
 Date: July 2, 2021  
 Project: RAPSON SUBDIVISION  
 Location: EL PASO COUNTY

## SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth 0.60 inches  
 Depth of Average Runoff Producing Storm,  $d_6$  = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA												
Area ID	C1.1												
Downstream Design Point ID	1												
Downstream BMP Type	None												
DCIA (ft <sup>2</sup> )	--												
UIA (ft <sup>2</sup> )	6,228												
RPA (ft <sup>2</sup> )	16,347												
SPA (ft <sup>2</sup> )	--												
HSG A (%)	0%												
HSG B (%)	100%												
HSG C/D (%)	0%												
Average Slope of RPA (ft/ft)	0.029												
UIA:RPA Interface Width (ft)	10.00												

## CALCULATED RUNOFF RESULTS

Area ID	C1.1												
UIA:RPA Area (ft <sup>2</sup> )	22,575												
L / W Ratio	16.00												
UIA / Area	0.2759												
Runoff (in)	0.00												
Runoff (ft <sup>3</sup> )	0												
Runoff Reduction (ft <sup>3</sup> )	260												

## CALCULATED WQCV RESULTS

Area ID	C1.1												
WQCV (ft <sup>3</sup> )	260												
WQCV Reduction (ft <sup>3</sup> )	260												
WQCV Reduction (%)	100%												
Untreated WQCV (ft <sup>3</sup> )	0												

## CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	1												
DCIA (ft <sup>2</sup> )	0												
UIA (ft <sup>2</sup> )	6,228												
RPA (ft <sup>2</sup> )	16,347												
SPA (ft <sup>2</sup> )	0												
Total Area (ft <sup>2</sup> )	22,575												
Total Impervious Area (ft <sup>2</sup> )	6,228												
WQCV (ft <sup>3</sup> )	260												
WQCV Reduction (ft <sup>3</sup> )	260												
WQCV Reduction (%)	100%												
Untreated WQCV (ft <sup>3</sup> )	0												

## CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft <sup>2</sup> )	22,575
Total Impervious Area (ft <sup>2</sup> )	6,228
WQCV (ft <sup>3</sup> )	260
WQCV Reduction (ft <sup>3</sup> )	260
WQCV Reduction (%)	100%
Untreated WQCV (ft <sup>3</sup> )	0

## Rapson Subdivision

Type II 24-hr 100yr Rainfall=4.60"

Prepared by HydroCAD SAMPLER 1-800-927-7246 www.hydrocad.net

Printed 2/7/2021

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Page 7

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### Summary for Subcatchment 1S: Rapson Subdivision

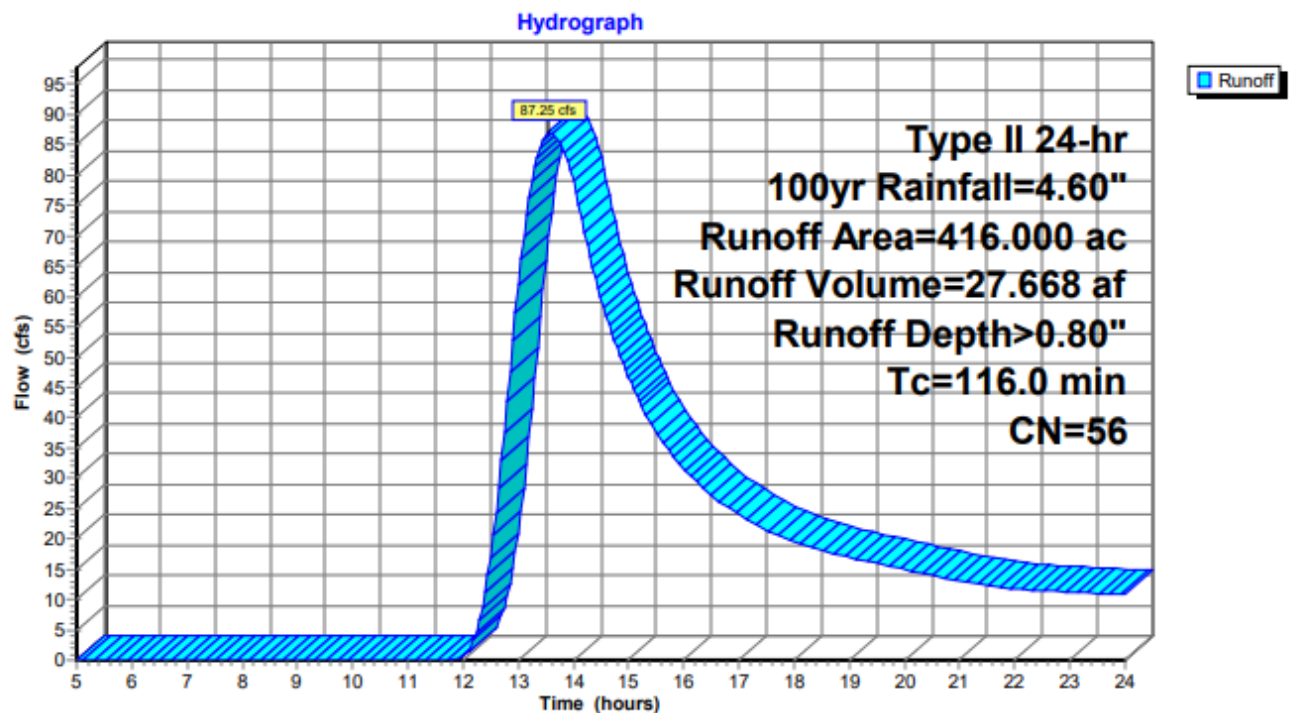
Runoff = 87.25 cfs @ 13.56 hrs, Volume= 27.668 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100yr Rainfall=4.60"

Area (ac)	CN	Description
* 416.000	56	
416.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
116.0					Direct Entry,

### Subcatchment 1S: Rapson Subdivision



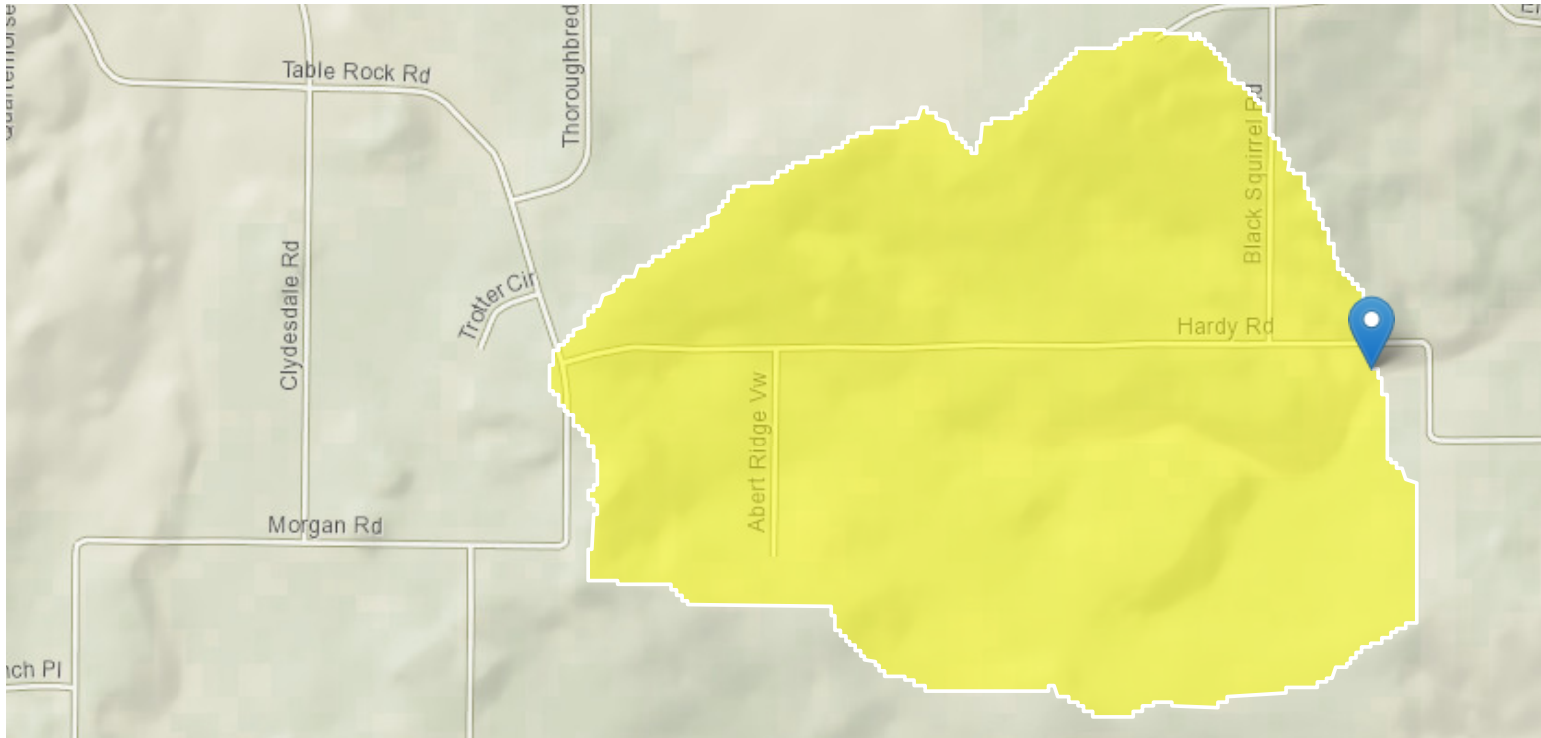
# StreamStats Report

Region ID: CO

Workspace ID: CO20210207173404046000

Clicked Point (Latitude, Longitude): 39.08882, -104.62790

Time: 2021-02-07 10:34:22 -0700



10675 Hardy Road - Rapson

## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	6	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	143.5	feet per mi
DRNAREA	Area that drains to a point on a stream	0.65	square miles
EL7500	Percent of area above 7500 ft	28	percent
ELEV	Mean Basin Elevation	7474	feet
ELEVMAX	Maximum basin elevation	7570	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.97	inches

Parameter Code	Parameter Description	Value	Unit
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.89	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.088784	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	4	percent
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	92.6	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	0	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	3.9	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	3.2	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0.1	percent
LFPLENGTH	Length of longest flow path	1.3	miles
LONG_OUT	Longitude of Basin Outlet	-104.627964	degrees
MINBELEV	Minimum basin elevation	7370	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7374	feet
PRECIP	Mean Annual Precipitation	20.64	inches
RCN	Runoff-curve number as defined by NRCS ( <a href="http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba">http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba</a> )	56.16	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.47	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	98	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0.0837	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	1.89	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0.1	percent

Parameter Code	Parameter Description	Value	Unit
TOC	Time of concentration in hours	1.93	hours

#### Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.65	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3	inches	2.38	4.89
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5
OUTLETELEV	Elevation of Gage	7374	feet	4290	8270

#### Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
50_percent_AEP_flood	6.13	ft <sup>3</sup> /s	117
20_percent_AEP_flood	15.4	ft <sup>3</sup> /s	87
10_percent_AEP_flood	24.4	ft <sup>3</sup> /s	80
4_percent_AEP_flood	39.3	ft <sup>3</sup> /s	80
2_percent_AEP_flood	52.8	ft <sup>3</sup> /s	83
1_percent_AEP_flood	69.7	ft <sup>3</sup> /s	88
0_5_percent_AEP_flood	88.4	ft <sup>3</sup> /s	94
0_2_percent_AEP_flood	117	ft <sup>3</sup> /s	104

#### Peak-Flow Statistics Citations

**Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A., 2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (<http://dx.doi.org/10.3133/sir20165099>)**

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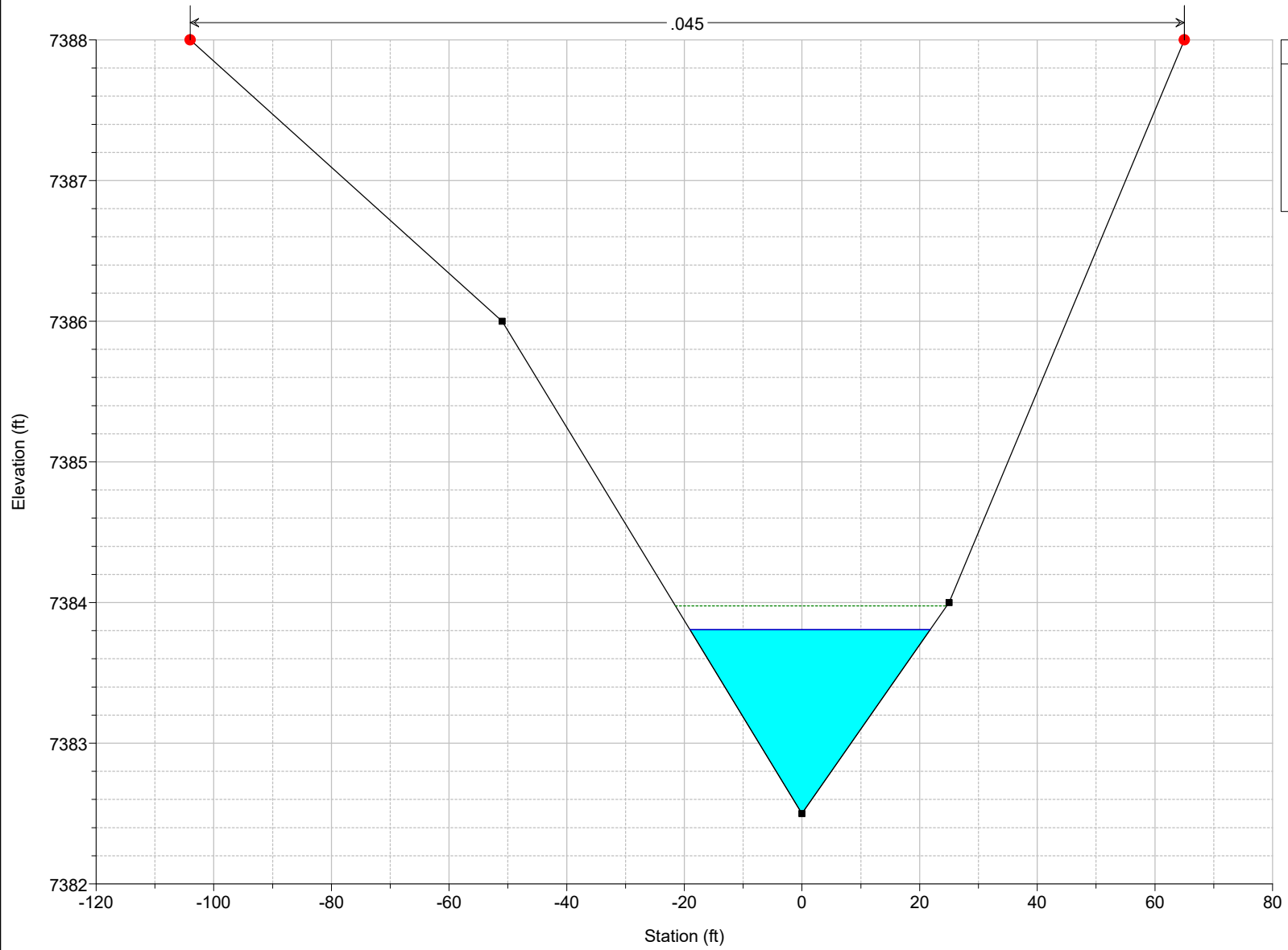


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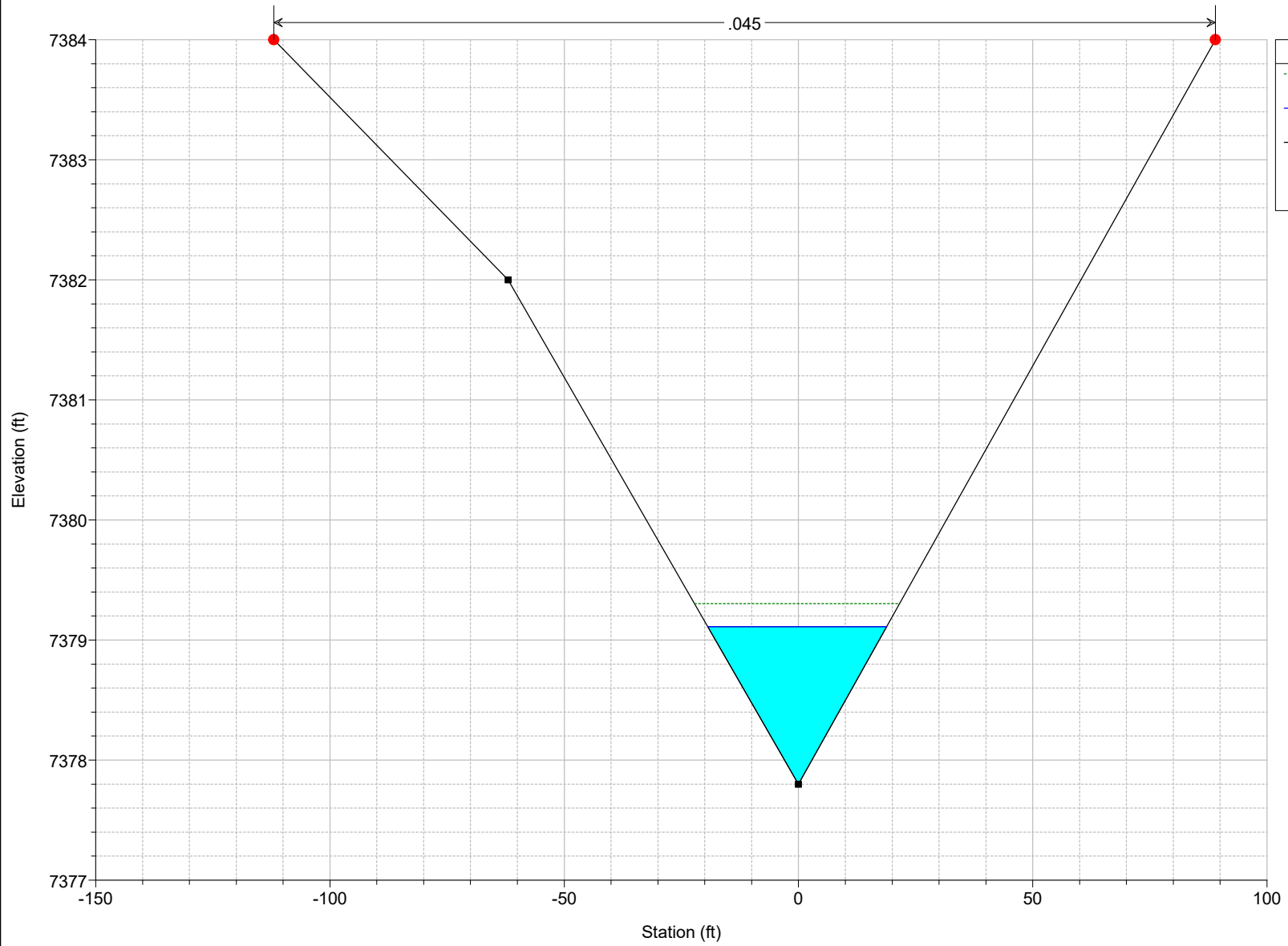
USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.4.0

Rapson Plan: 100yr Subcritical 2/17/2021  
RS = 715

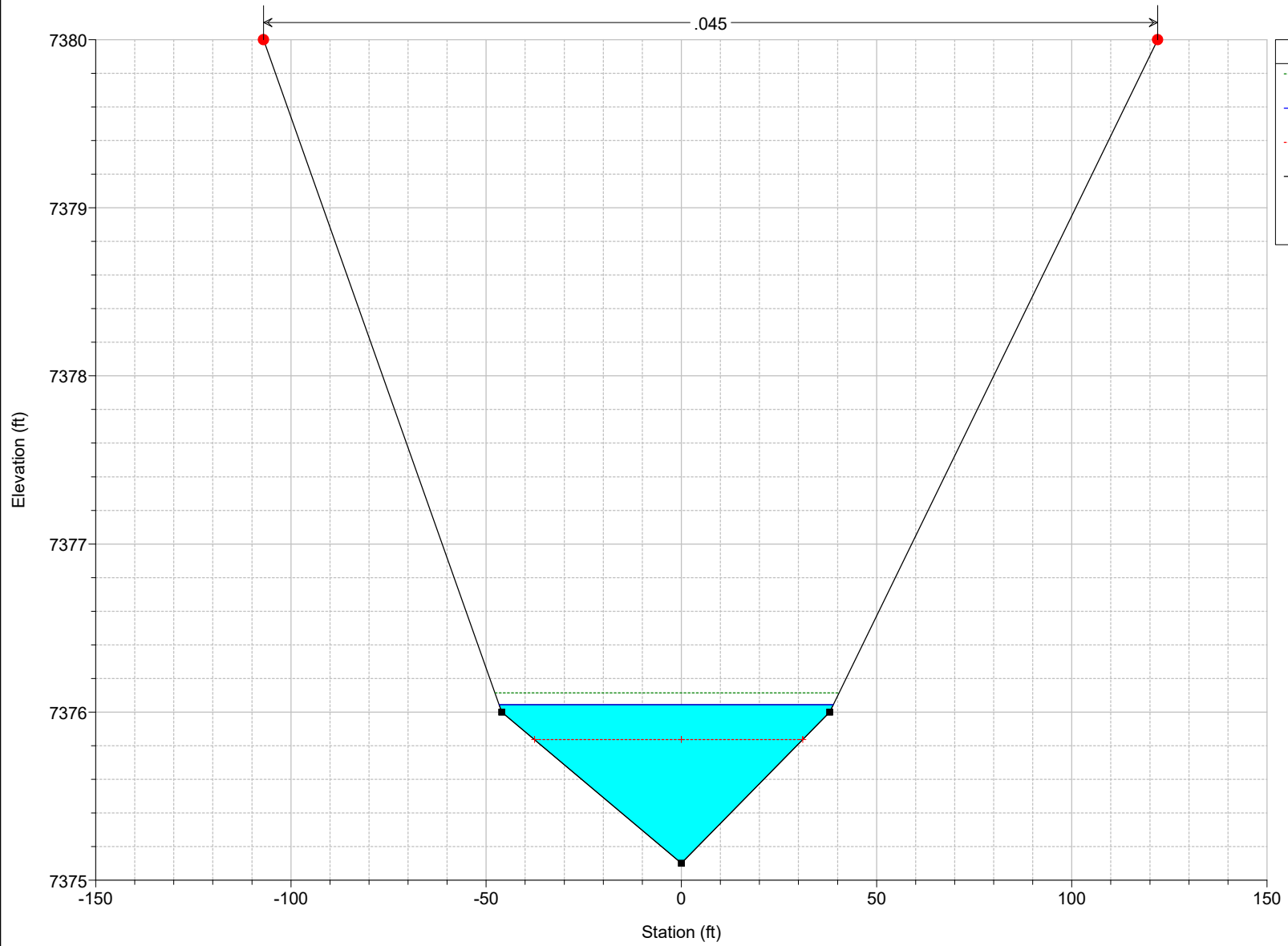


Rapson Plan: 100yr Subcritical 2/17/2021  
RS = 465

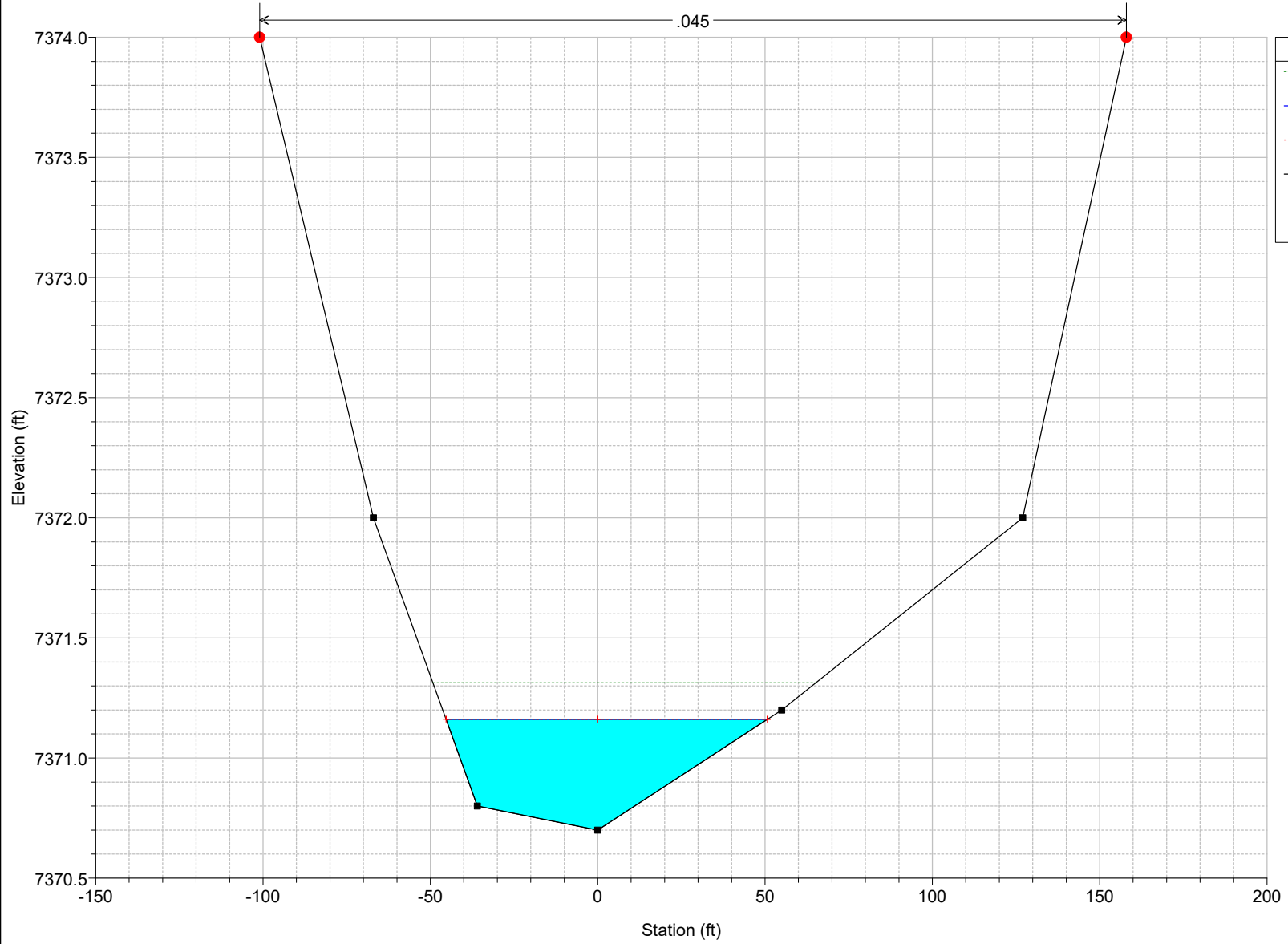


- Legend**
- EG PF 1
  - WS PF 1
  - Ground
  - Bank Sta

Rapson Plan: 100yr Subcritical 2/17/2021  
RS = 245



Rapson Plan: 100yr Subcritical 2/17/2021  
RS = 0



Legend	
EG PF 1	
WS PF 1	
Crit PF 1	
Ground	
Bank Sta	

HEC-RAS Plan: 100Yr Sub River: Creek Reach: Mainstem Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Mainstem	715	PF 1	88.00	7382.50	7383.81		7383.98	0.017596	3.30	26.71	40.85	0.72
Mainstem	465	PF 1	88.00	7377.80	7379.11		7379.30	0.019944	3.51	25.04	38.19	0.77
Mainstem	245	PF 1	88.00	7375.10	7376.04	7375.84	7376.11	0.010778	2.12	41.56	85.61	0.54
Mainstem	0	PF 1	88.00	7370.70	7371.16	7371.16	7371.31	0.045915	3.12	28.17	96.04	1.02

#### Steady Flow Boundary Conditions

☒ Set boundary for all profiles
 ☐ Set boundary for one profile at a time

Available External Boundary Condition Types

Known W.S.

Critical Depth

Normal Depth

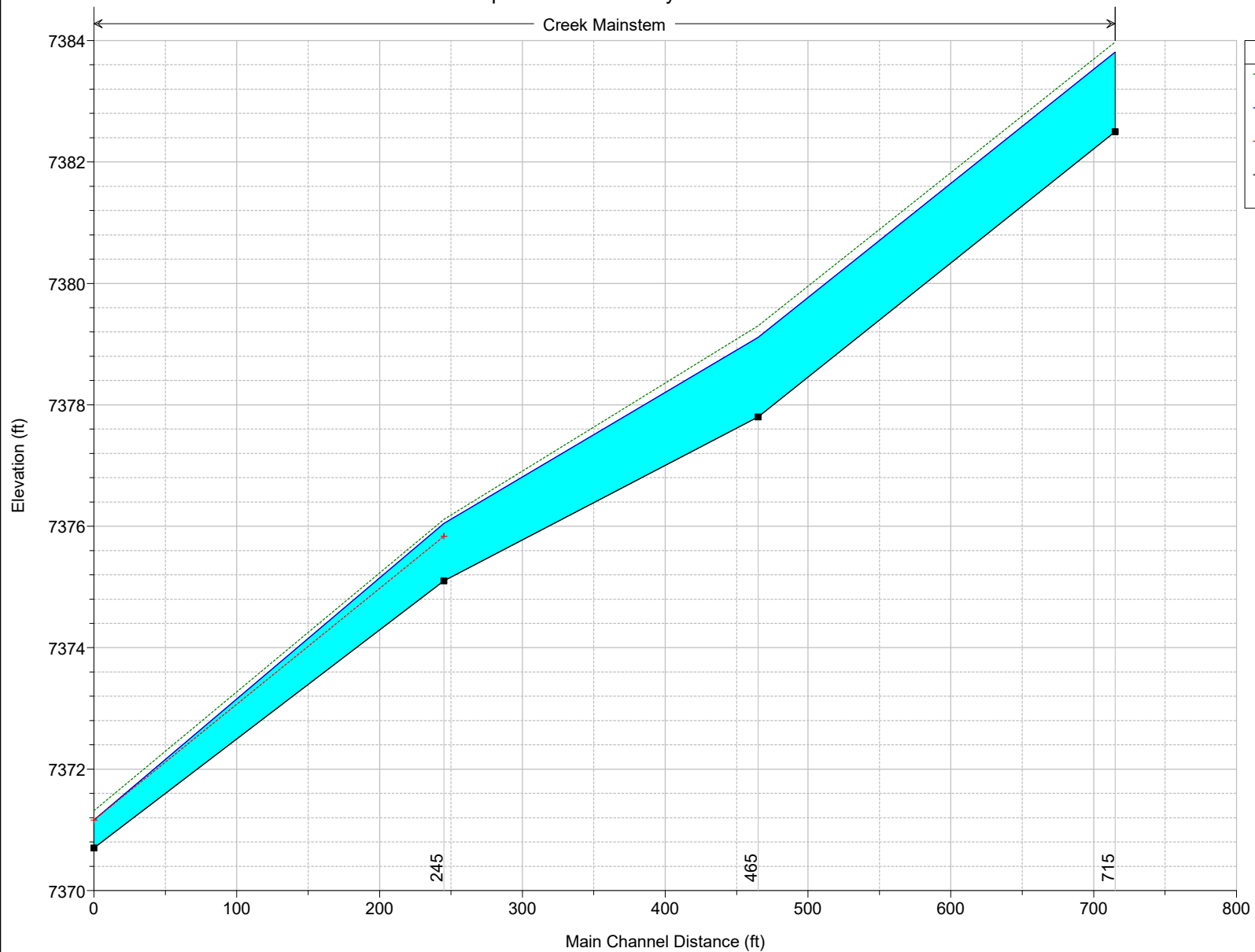
Rating Curve

Delete

Selected Boundary Condition Locations and Types

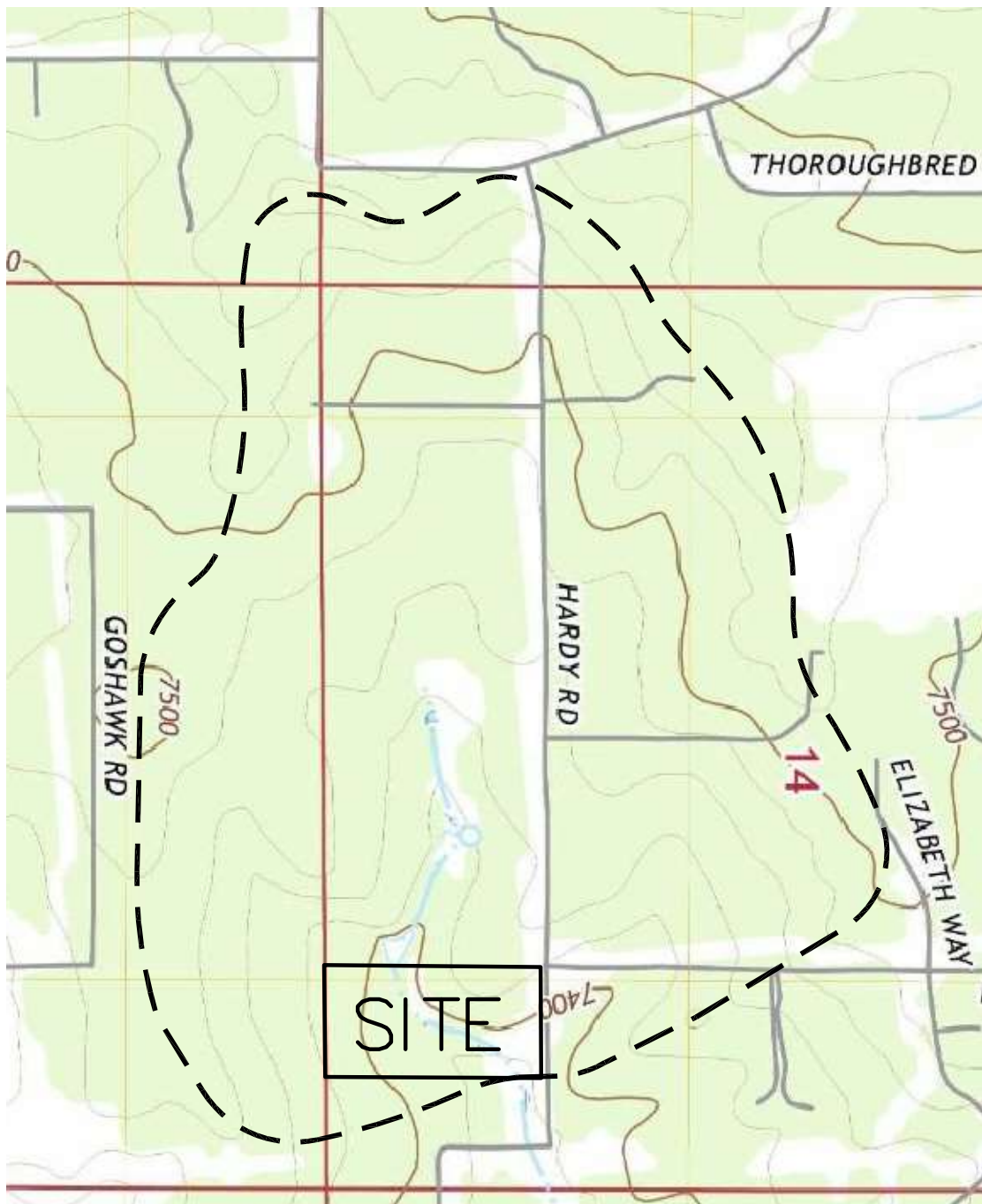
River	Reach	Profile	Upstream	Downstream
Creek	Mainstem	all	Normal Depth S = 1.4	Normal Depth S = 1.8

Rapson Plan: 100yr Subcritical 2/7/2021




# DRAINAGE PLAN

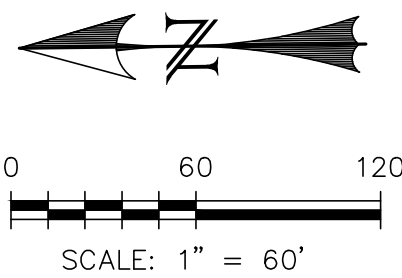




UNNAMED TRIBUTARY  
TO WEST KIOWA CREEK



 PO BOX 692 DIVIDE, CO 80814 (719) 426-2124	RAPSON SUBDIVISION	SCALE: 1"=1000'	DATE: 2/9/21
	USGS WATERSHED MAP	JOB NO.: 20-289	SHEET: 1 OF 1



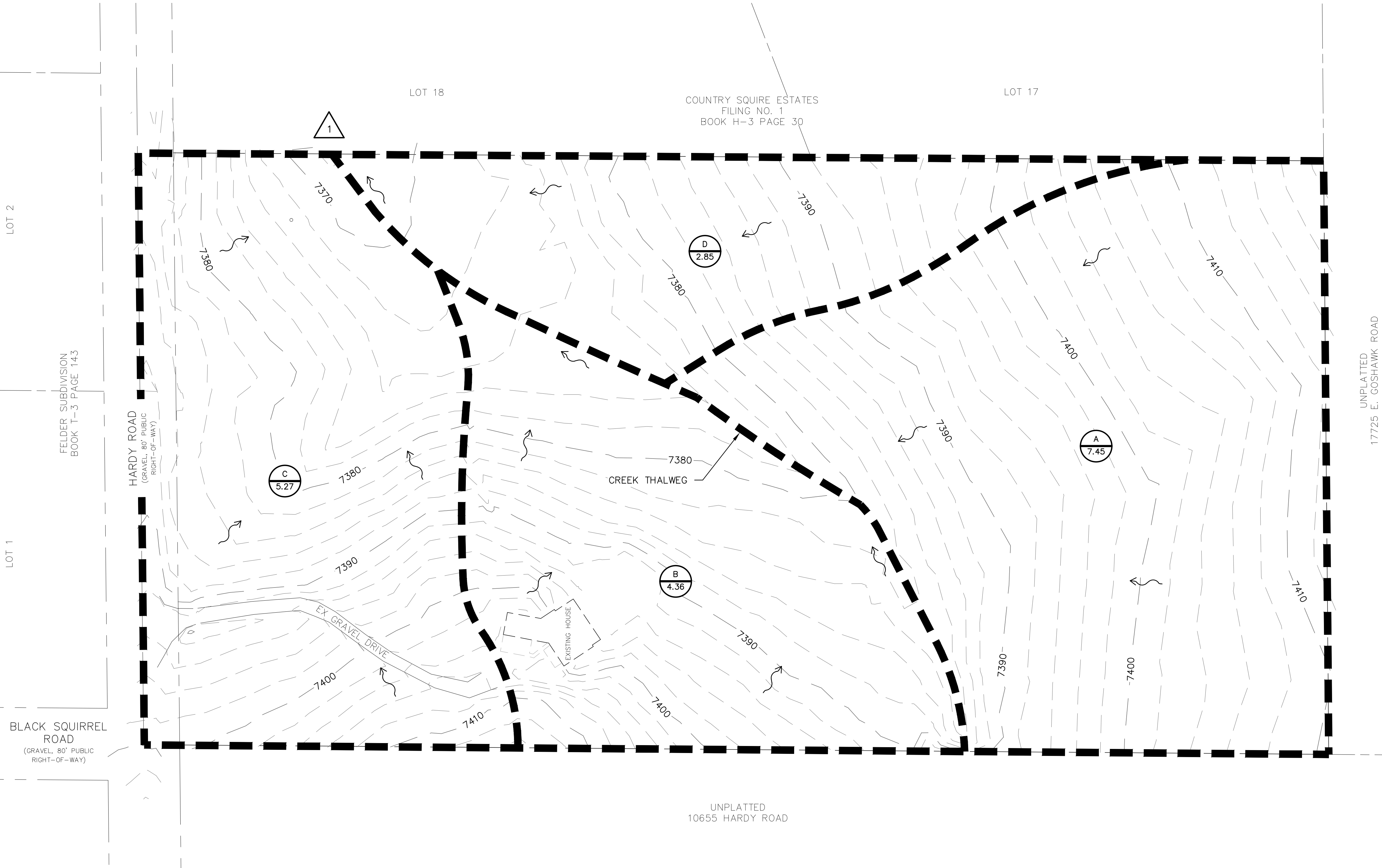
DRAINAGE BASINS-EXISTING			
BASIN	AREA (ACRES)	Q5 (CFS)	Q100 (CFS)
A	7.45	4.1	22.8
B	4.36	2.2	11.0
C	5.27	3.6	16.3
D	2.85	1.7	9.5

DESIGN POINT-EXISTING CONDITIONS			
DESIGN POINT	DESCRIPTION	Q5 (CFS)	Q100 (CFS)
1	SITE RUNOFF	8.3	42.7

NOTE: THE TOTAL Q100 DISCHARGE AT DESIGN POINT 1 IS ~88CFS. REFER TO STREAMSTATS CALCULATIONS.

DRAINAGE LEGEND

- BASIN IDENTIFIER  
BASIN AREA [AC]
- DESIGN POINT IDENTIFIERS
- DRAINAGE BASIN BOUNDARY
- SURFACE SHEET FLOW DIRECTION
- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- (P) BOUNDARY
- EXISTING (E)  
PROPOSED (P)  
FUTURE (F)



REV.	DESCRIPTION	DATE

Know what's below.  
Call 72 hours before you dig.  
For more details visit:  
[www.call811.com](http://www.call811.com)

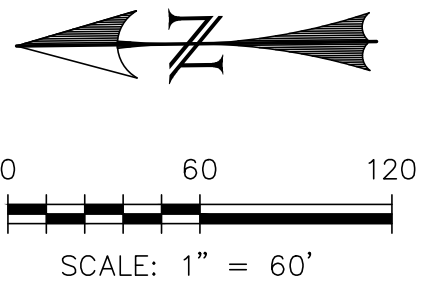
PREPARED FOR:  
ANREA JAYNE RAPSON  
& WILLIAM CLARK RAPSON

PREPARED UNDER MY DIRECT SUPERVISION FOR AND BEHALF OF CATAMOUNT ENGINEERING.  
  
DAVID L. MIJARES, COLORADO PE #40510  
DATE

CATAMOUNT  
ENGINEERING  
321 W. HENRIETTA AVE WOODLAND PARK, CO 80866  
PO BOX 221 (719)426-2124

RAPSON SUBDIVISION  
DRAINAGE PLAN-EXISTING

DESIGNED BY: DLM	DRAWN BY: DLM
SCALE: 1" = 60'	DATE: 7/2/21
JOB NUMBER: 20-289	SHEET: 1 OF 1



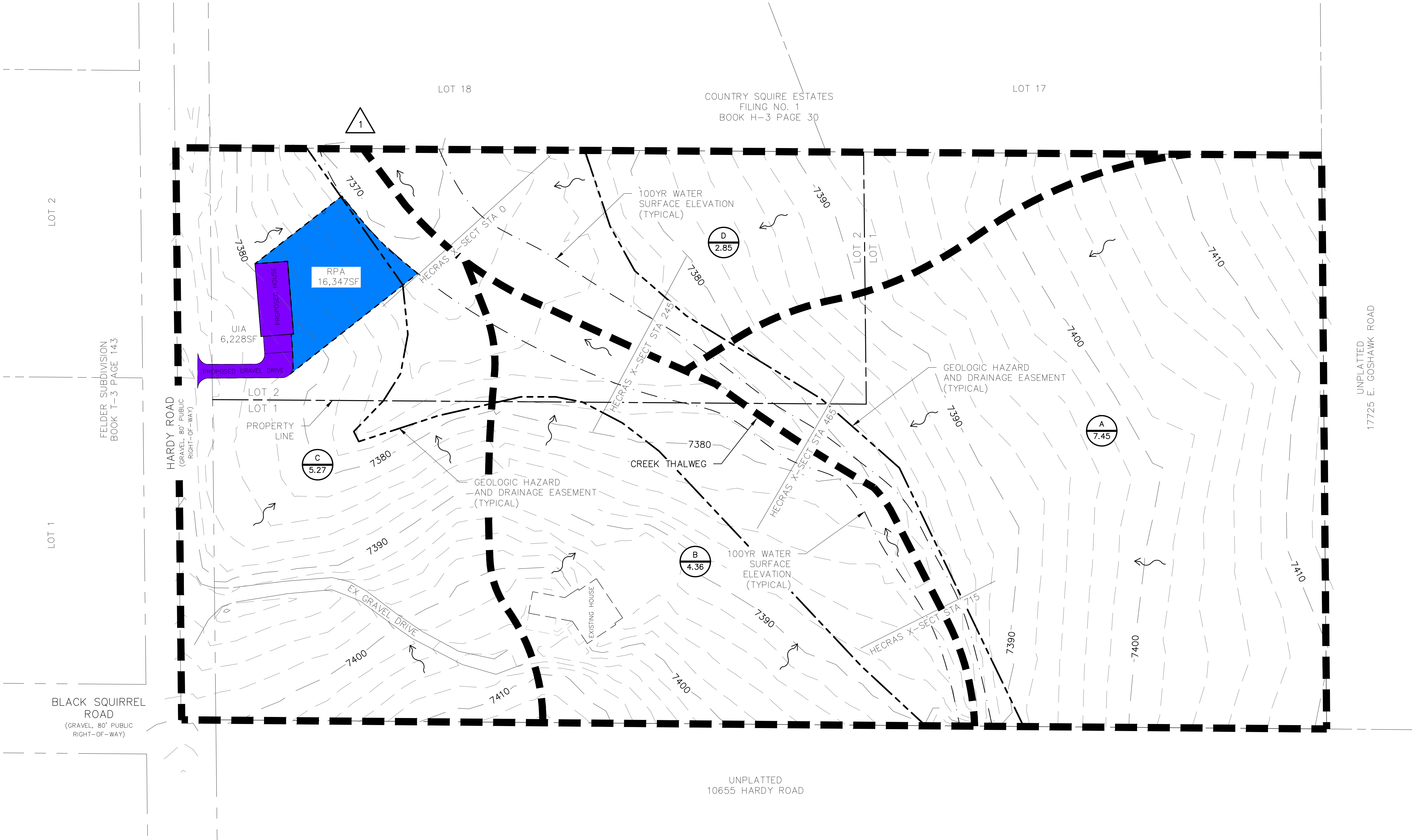
DRAINAGE BASINS-DEVELOPED			
BASIN	AREA (ACRES)	Q5 (CFS)	Q100 (CFS)
A	7.45	4.1	22.8
B	4.36	2.2	11.0
C	5.27	3.8	16.5
D	2.85	1.7	9.5

DESIGN POINT-DEVELOPED CONDITIONS			
DESIGN POINT	DESCRIPTION	Q5 (CFS)	Q100 (CFS)
1	SITE RUNOFF	8.5	42.9

NOTE: THE TOTAL Q100 DISCHARGE AT DESIGN POINT 1 IS ~88CFS. REFER TO STREAMSTATS CALCULATIONS.

DRAINAGE LEGEND

- BASIN IDENTIFIER  
BASIN AREA [AC]
- DESIGN POINT IDENTIFIERS
- DRAINAGE BASIN BOUNDARY
- SURFACE SHEET FLOW DIRECTION
- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- (P) BOUNDARY
- EXISTING (E)  
PROPOSED (P)  
FUTURE (F)
- (P) DISCONNECTED IMPERVIOUS AREA
- (P) RECEIVING PERVIOUS AREA



REV.	DESCRIPTION	DATE

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PREPARED FOR:  
ANREA JAYNE RAPSON  
& WILLIAM CLARK RAPSON

PREPARED UNDER MY DIRECT SUPERVISION FOR AND BEHALF OF CATAMOUNT ENGINEERING.

DAVID L. MIJARES, COLORADO PE #40510

DATE



RAPSON SUBDIVISION  
DRAINAGE PLAN-DEVELOPED

DESIGNED BY: DLM	DRAWN BY: DLM
SCALE: 1" = 60'	DATE: 7/2/21
JOB NUMBER: 20-289	SHEET: 1 OF 1